THAT WHICH IS CLAIMED:

1. An electromagnet comprising:

a core;

at least one winding disposed circumferentially about the core such that the winding extends at least one revolution around the core; and

at least one spacer disposed circumferentially about the core and adjacent to the at least one winding, wherein the spacer defines channels therein.

2. An electromagnet according to Claim 1, wherein the channels extend in a generally longitudinal direction along the core.

3. An electromagnet according to Claim 2, wherein the spacer defines a lattice of diagonally extending channels.

4. An electromagnet according to Claim 1, wherein the channels extend in a generally circumferential direction about the core.

5. An electromagnet according to Claim 4, wherein the spacer comprises linked parallel strips.

6. An electromagnet according to Claim 1, further comprising alternating windings and spacers disposed circumferentially about the core such that each spacer is adjacent to a winding.

7. An electromagnet according to Claim 1, further comprising a first endplate defining an inlet and a second endplate defining an outlet.

8. An electromagnet according to Claim 7, further comprising a housing extending circumferentially about the winding and spacer and between the first and second endplates such that the winding and spacer are enclosed.

9. An electromagnet according to Claim 7, wherein the first endplate further defines channels having a substantially serpentine configuration thereby defining a path for a coolant medium through the inlet, about the channels defined in the first endplate, through the channels defined in the spacer, and out of the outlet.

10. An electromagnetic apparatus comprising:

an electromagnet further comprising:

a core;

at least one winding disposed circumferentially about the core such that the winding extends at least one revolution around the core;

at least one spacer disposed circumferentially about the core and adjacent to the at least one winding, wherein the spacer defines channels therein; and

a current source electrically coupled to the electromagnet, such that the current source is capable of directing current through the at least one winding.

11. An electromagnet apparatus according to Claim 10, wherein the channels extend in a generally longitudinal direction along the core.

12. An electromagnet apparatus according to Claim 11, wherein the spacer defines a lattice of diagonally extending channels.

13. An electromagnet apparatus according to Claim 10, wherein the channels extend in a generally circumferential direction about the core.

14. An electromagnet apparatus according to Claim 13, wherein the spacer comprises linked parallel strips.

15. An electromagnet apparatus according to Claim 10, further comprising alternating windings and spacers disposed circumferentially about the core such that each spacer is adjacent to a winding.

16. An electromagnet apparatus according to Claim 10, further comprising a first endplate defining an inlet and a second endplate defining an outlet.

17. An electromagnet apparatus according to Claim 16, further comprising a housing extending circumferentially about the winding and spacer and between the first and second endplates such that the winding and spacer are enclosed.

18. An electromagnet apparatus according to Claim 16, wherein the first endplate further defines channels having a substantially serpentine configuration thereby defining a path for a coolant medium through the inlet, about the channels defined in the first endplate, through the channels defined in the spacer, and out of the outlet.

19. An electromagnet apparatus according to Claim 10, wherein the current source comprises a drill motor.

20. A method of cooling an electromagnet, the method comprising:

providing an electromagnet having at least one spacer defining channels therein and a coil comprising at least one winding, wherein the winding and spacer extend adjacent and circumferentially about a core, wherein the electromagnet further comprises a first endplate defining an inlet and a second endplate defining an outlet, and wherein a housing extends circumferentially about the winding and spacer and between the first and second endplates such that the coil and spacer are enclosed;

magnetizing the electromagnet by providing a current to the coil; and

supplying a cooling medium into the inlet defined within the first endplate and through the channels of the spacer and out of the outlet defined within the second endplate, and wherein supplying the cooling agent cools the electromagnet.

21. A method according to Claim 20, the method further comprising supplying the cooling medium about serpentine channels defined with the first endplate prior to reaching the channels of the spacer.

22. A method according to Claim 20, wherein providing the electromagnet comprises providing a spacer defining channels extending in a generally longitudinal direction along the core.

23. A method according to Claim 22, wherein providing the electromagnet comprises providing a spacer defining a lattice of diagonally extending channels therein.

24. A method according to Claim 20, wherein providing the electromagnet comprises providing a spacer having channels extending in a generally circumferential direction about the core.

25. A method according to Claim 24, wherein providing the electromagnet comprises providing a spacer having linked parallel strips.

26. A method according to Claim 20, further comprising providing alternating windings and spacers circumferentially about the core such that each spacer is adjacent to a winding.